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ABSTRACT

This administrator and instructor section of a South Carolina industrial arts safety guide includes sections on responsibility for school safety, safety programming for the teacher, emergency action, suggested forms and outlines, and facility design and layout. School board and superintendent, administrator, and teacher responsibilities for school safety are outlined. Discussed in a section on safety programming for the teacher are instructional techniques, safety inspections, accident reporting and analysis, safe practices in the care and operation of equipment, housekeeping practices, electrical safety, fire safety, first aid planning, personal practices, and eye protection. Emergency communications and first aid procedures are described in section 4. Presented next are suggested forms and outlines, including forms for recording emergency telephone numbers and parent permission and acknowledgement slips, master checklists, hazardous conditions reports, and first aid and emergency procedures. Space allocation, lighting, ventilation, personal facilities, selection of machine tools, special hazards, and noise control are examined in a section on facility design and layout. (The student section of the guide is available separately through ERIC--see note). (MN)

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North Carolina
Visual Arts

Administrator and Instructor Section

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SOUTH CAROLINA DEPARTMENT OF EDUCATION: AN EQUAL OPPORTUNITY AGENCY

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Spring – 1981

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Introduction

Effective safety awareness education leads to attitudes and consciousness resulting in safe working practices and accident prevention within the school Industrial Arts laboratory.

The task of overcoming the "It can't happen to me" attitude is a big one and requires that safety awareness be an integral part of the everyday instructional program. This guide is intended to serve in helping teachers instill safety awareness in their students.

Safety consciousness requires that the student be educated in safety generally and specifically. The teacher, in working to develop a positive attitude toward safety, should teach the student to ask "Is what I am about to do unsafe in any way to myself, to others, or to property?" It is essential that the instructional methods lend themselves to positive safety attitude development. This includes (1) a clean and orderly working environment, (2) the awareness of possible accident situations where RESPECT replaces fear, (3) the importance of rules and regulations, (4) the necessity to teach the correct way to perform the first time, (5) the knowledge and skills in the use of and the proper maintenance of tools and machines, and (6) the reinforcement of safe operating procedures.

Student participation greatly increases the effectiveness of any safety education program. Students should be actively involved in planning and presenting programs and demonstrations that involve the subject of safety as well as the care and maintenance of tools and machines.

This guide is intended to alert the school district staff to their areas of responsibility and, at the same time, to reduce accidents and exposure to litigation.

Foreword 1.01

Policy Statement on Safety 1.02

STATE OF SOUTH CAROLINA
DEPARTMENT OF EDUCATION
COLUMBIA 29201

Charlie G. Williams
State Superintendent of Education

To Industrial Arts Teachers:

As Director of Vocational Education, I fully recognize the importance of safety as an integral part of today's modern industrial arts curriculum. In order to prevent injury and time loss, good safety habits, practices and attitudes must be automatic and can best be acquired through a carefully planned and implemented safety education program.

This SOUTH CAROLINA INDUSTRIAL ARTS SAFETY GUIDE should not be construed to be an answer to all safety problems, but should be recognized as a vehicle for improving safety instruction and for building strong position attitudes toward safety -- an important aspect of our instructional programs.

School boards, administrators, teachers and students are encouraged to adopt and utilize this safety guide in order to become more aware of unsafe acts and unsafe conditions and then to take appropriate remedial action. Only by a unified effort can accidents be prevented and good safety attitudes developed.

Sincerely,

Moody Oswald

Moody Oswald, Director
Office of Vocational Education

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POLICY STATEMENT ON SAFETY

A suggested safety education policy statement is provided below:

IT IS THE POLICY OF THE_____SCHOOL BOARD THAT AN EFFECTIVE SAFETY EDUCATION PROGRAM BE CONDUCTED THROUGHOUT THE SCHOOL SYSTEM, WITH ITS PRIME OBJECTIVE BEING ACCIDENT PREVENTION.

The implementation of this policy will help make young people and adults more aware of the dangers that exist about them in today's world and of the need for attitude and habit development that will ensure safe living and conservation of our human resources.

The local superintendent shall be responsible for the implementation of this policy and shall make necessary appointments and delegation of authority to see that effective safety training and procedures are carried out at all levels within the district. The superintendent shall see that the safety laws, codes, administrative regulations and suggested practices of the State of South Carolina be followed as they relate to the educational system. The staff should make extensive use of appropriate safety guides and manuals that have been produced and distributed by the South Carolina State Superintendent of Education.

Responsibility

The school board, the administration and the instructor have the legal responsibility to provide a safe place for students to work while they are participating in industrial arts activities.

To protect yourself and your school district from liability you should be familiar with and follow the codes and regulations applicable to your program.

To protect yourself against financial loss, liberal liability insurance limits should be carried, either through the school district policy or as an individual.

Liability insurance can vary substantially among school districts. You should be aware of the limitations of your school district liability policy.

Individual coverage may be expanded through the South Carolina Education Association, other educational associations or through your personal insurance agent or broker.

Safety is not a "one man show". The school board and superintendent, the administrator (principal or department head), and the teacher all need to do their part.

School Board and Superintendent 2.01

The Administrator
Principal or Department Head 2.02

The Teacher 2.03

School Board and Superintendent

The school district controls budget, curriculum and personnel policy to a major degree. Without district level support, safety program effectiveness will at best be spotty, carried by dedicated personnel and ignored by others.

The school board and superintendent should:

1. Fund necessary improvements and maintenance to facilities, safety supplies and equipment to produce a safe instructional environment;

2. Support instructional control measures to promote safety within the industrial arts program;

3. See that industrial arts curriculum devotes sufficient time for safety instruction;

4. Review and maintain adequate liability insurance coverage to protect the district, administrators and the instructor from liability claims;

5. Evaluate performance of the school administration and teachers regarding safety procedures, equipment and instruction quality;

6. Provide for the safety of the students when innovations involving curriculum changes are made;

7. Include a safety review as an integral part of the design for new or remodeled facilities;

8. Appoint a safety coordinator for the school district who will be self-motivated as well as have a zeal to help others in their accident prevention programs;

9. Make insurance available so that the student may purchase it at a reasonable cost.

The Administrator (Principal or Department Head)

The individual school is the central unit of an educational enterprise. Therefore, the building principal is likely to be the administrator who is most directly concerned with the school laboratory safety program. If a specialized supervisor or department head functions under the principal and works directly with the teachers, some of the responsibilities for the safety program may be delegated.

The following functions are generally considered the responsibility of the school administrator in a comprehensive industrial arts safety education program:

1. Secure support from and maintain liaison with top school system administration.
   a. Secure approval for the safety education program.
   b. Secure adequate budgetary support.
   c. Expedite building changes necessary for safe operation.
   d. Arrange for procurement of safety equipment.
   e. See that appropriate staff members are kept informed of the specific maintenance requirements for safe operation of industrial arts facilities.
2. Provide leadership in planning the program.
   a. Initiate a specific program of safety education.
   b. Carefully select industrial arts instructors and substitutes for temperament, specific industrial arts education, knowledge and skill so that safe work, equipment operating and personal protective measures will be taught and followed.
   c. Set up in-service training in accident prevention for teachers.
   d. Maintain contact with parents to aid safety program and to take administrative measures to reduce liability exposures.
3. Secure action on a program of safety education that will involve not only the industrial arts student but the entire student body.
   a. Check periodically to make sure an adopted safety education program is in effect.
   b. Observe teachers for assurance that safety instruction is a functioning part of the course of study.
   c. Stimulate the discovery, analysis and prompt correction of unsafe conditions or practices.
   d. Support teachers in enforcing safety regulations.

The Administrator (Principal or Department Head) – Continued

e. Receive and review accident reports.

f. Utilize District procedures for investigating and analyzing accidents.

g. See that instructional staff maintains first aid proficiency and that supplies and emergency handling procedures are current and properly maintained.

4. Provide safe facilities and services.

   a. Report unsafe conditions which cannot be corrected at school level to higher authority.

   b. Plan with teachers for the removal of unsafe conditions and other hazards, and the installation of safety devices.

   c. See that industrial arts facilities are regularly inspected for condition of equipment and safety devices, proper housekeeping, adequacy of exits, ventilation and refuse handling systems, and make the necessary changes as needed.

   d. See that safety and applicable safety regulations are specifically reviewed in the planning of new or remodeled facilities.

   e. Provide class loads that are in keeping with the capacity, square footage, and number of work stations available in each facility.

5. Secure cooperation of outside personnel and agencies.

   a. Assist the teachers in locating qualified community personnel and services which will be helpful in the safety program.

   b. Encourage qualified outside individuals to assist in the school shop safety program.

The Teacher

The major responsibility for laboratory safety instruction in accident prevention falls on the teacher. The following are generally considered the responsibilities of the teacher in a comprehensive accident prevention program in school laboratories.

1. Incorporate safety instruction in the course of study.

2. Give instruction on potential hazards and accident prevention specific to the particular school laboratory.

3. Instigate a comprehensive safety program and enforce all rules and regulations.

4. Have set, pre-planned procedures in case of an emergency.

5. Set proper safety examples for students to follow.
6. Keep informed about modern and accepted safe practices in the field of accident prevention.
7. Regularly review laboratory facilities to provide for optimum safety conditions. Give special attention to:
   a. Layout
   b. Utilities and building services
   c. Equipment guarding
   d. Storage and condition of tools
   e. Storage, labeling and handling of materials.
8. Carry out recommendations of the administrator for improving safety instruction.
9. Devise and enforce safe housekeeping procedures.
10. Insist on proper protective equipment in all shop areas and require students to wear proper clothing and adequate hair guards while working in the laboratory.
11. Develop specific safe practices and regulations relating to your facilities.
12. Make recommendations to administrators for improving environmental safety conditions.
13. Produce prompt and thorough reports of accidents.
14. Be aware of the emotionally disturbed and accident prone student.
15. Always provide adequate and legal supervision in the classroom or laboratory.
16. Insist that adequate eye protection be worn in all potentially hazardous areas.
17. Provide proper instruction in the use of all tools, machines and equipment. Keep a record of each student's safety training.
18. Insist that guards meeting OSHA standards be provided and used whenever a machine is operated.

Safety Programming for the Teacher

As pointed out in the Introduction to the Safety Guide, safety is not something that is "picked up" by experience.

Safety is a subject that must be taught and integrated with other disciplines in education.

The control of accidents within the shop and the development of student safety attitudes and awareness will involve good practices in the following areas:

Instructional Techniques 3.01

Safety Inspections 3.02

Accident Reporting and Analysis 3.03

Safe Practices in the Care and Operation of Equipment 3.04

Housekeeping Practices 3.05

Electrical Safety 3.06

Fire Safety 3.09

First Aid Practices 3.10

Personal Protection 3.11

Eye Protection 3.12

Instructional Techniques

1. Develop a permanent safety consciousness in students through teacher example – always doing things the safe way while pointing out the potential hazard.
2. Teach accident prevention with a positive appraoch – stressing the right way to perform an operation.
3. Give laboratory demonstrations emphasizing the safe use of potentially hazardous machines and hand toois.
4. Present safety instruction with the following objectives in mind:
   a. Develop in students a sense of responsibility for their own safety and that of others.
   b. Emphasize importance of hair protection and clothing to safety.
   c. Help students understand that the safe way of doing things is effective.
   d. Help students recognize situations involving potential hazards.
   e. Help students learn safe practices to use in their own day-to-day activities.
5. Provide instruction on what to do in case of a shop accident.
6. Give periodic demonstrations on the proper use and care of personal protective devices.
7. Use information sheets dealing with the general safety rules of the industrial arts laboratory.
8. Provide instruction in the basic maintenance of shop tools, machines and other equipment.
9. Provide instruction in the safe methods of lifting and/or moving heavy equipment or other loads.
10. Provide a bulletin board for safety bulletins, safety posters, and safety rules and regulations.
11. Require all beginning students to make a careful study of potential hazards in the laboratory during the first few days of the course.
12. Utilize a student safety committee to strengthen the safety program.
13. Use a bell, whistle, or some other type of alarm to command the attention of every student in the laboratory during emergency situations.

Safety Inspections

1. Use a safety check list to assure that all safety factors are checked during safety inspections.
2. Have in-depth safety inspections of the industrial arts facility made at least annually.
   a. School personnel – state and/or local level
   b. A student safety committee
   c. A student inspector or foreman
3. Encourage teachers to welcome inspections by:
   a. Insurance safety engineers;
   b. Inspectors from the State Department of Labor and Industry;
   c. State fire inspectors;
   d. Advisory Committee Members
4. Rotate assignments of students to the safety committee.

Accident Reporting and Analysis

1. Require students to report all accidents to the teacher, regardless of nature or severity.
2. Keep a record of all industrial arts accidents resulting in injury to students, regardless of nature or severity.
3. Analyze all accident reports for the purpose of aiding in the prevention of other accidents.
4. Use your school district's printed or duplicated form to record the details of accidents and forward to the appropriate personnel.

Safe Practices in the Care & Operation of Equipment

1. Enclose all gears, moving belts, and other power transmission devices with permanent guards or barricades.
2. Permit each student to operate a machine only after demonstrating an ability to operate the machine safely.
3. Require a signed statement from a parent granting permission for students to operate power machines.
4. Prohibit students from operating machines when the instructor is not present.
5. Prohibit the use of defective tools, machines, or other equipment.
6. Maintain strict supervision of students who are using machines and tools.
7. Prohibit the removal of guards and safety devices.
8. Maintain an awareness of the effective use of safeguards against the potential hazards associated with Industrial Arts activities.
9. Provide safety zones around each piece of equipment by designating the area with painted lines.
10. Prohibit conversations between machine operators and other students while using machine.
11. Secure all machinery and equipment in place.
12. Post safety rules at or near each potentially hazardous machine.
13. Identify all eye protection areas with appropriate signs.

Housekeeping Practices

1. Provide for the daily removal of all sawdust, shavings, metal cuttings and other waste material.
2. Provide properly marked boxes or bins for various kinds of scrap stock.
3. Utilize sturdy racks and bins for material storage, arranged to keep material from falling on students and to avoid injuries from protruding objects.
4. Employ a standard procedure to keep floors free of oil, water and foreign material.
5. Provide brushes for the cleaning of equipment after each use.
6. Provide regular custodial service in addition to end of class cleanup.
7. Prohibit the use of compressed air to clean clothing, equipment and work areas.
8. Keep walkways and work areas free of all obstructions.
9. Floor surfaces must be maintained in a "non skid" condition.

Electrical Safety

The use of electricity has become so common that few people realize the potential dangers of electrical energy. Most of the accidents that are caused by electricity could have been avoided if the hazard had been recognized and if action had been taken to correct the adverse condition.

The instructor must realize that any electrical circuit is a potential hazard, regardless of the amount of voltage or current present.

The nature of the injury may be affected by the frequency of the current and the kind of electrical energy. Direct current is usually considered less hazardous than alternating current as far as shock is concerned, but is more likely to produce severe burns and tissue damage. The physical condition of the victim is another factor which has a bearing on the severity of electrical shock.

Electrical accidents are caused by unsafe conditions, unsafe practices, or a combination of both.

A study of accidents in the State of California reveals that "unsafe practices were reported in four out of five accidents. Using unsafe or defective tools or equipment led the list, while failure to de-energize equipment, using tools or equipment in an unsafe manner and working in hazardous places were next in order."

Causes of electrical accidents can be traced to (1) defective equipment, (2) unsafe work practices, and (3) lack of knowledge of the dangers of electricity.

1. Defective Equipment:

   Types of equipment frequently involved in electrical accidents include motor – driven equipment, control devices, portable electric tools, switches, panels, cutouts, conductors, plugs and fuses, and electric extension cords. A variety of unsafe conditions involving the different types of equipment creates many electrical hazards. Some of the common defects of tools and equipment are listed as follows:

   a. Improperly grounded equipment (ground wires missing, broken or improperly connected);

   b. Open conduits, switch boxes, damaged or worn connections, and exposed live wires;

   c. Insulation which is defective, inadequate, worn, frayed, wet, oily or deteriorated, creating short circuit possibilities and energizing equipment frames;

   d. Defective switches, receptacles, extension cords, and lamp sockets;

   e. Dirty motor windings, improperly adjusted brushes, and worn commutators;

   f. Improperly connected power tools and defective insulation in portable tools;

   g. Broken housings, loose or vibrating machine parts which might contact and energize tool or machine frames and expose "live" surfaces to operator.

2. Unsafe Practices:

Unsafe practices and work procedures result in electrical accidents and fires. Some of the common unsafe acts committed in the shop are:

a. Using ungrounded equipment and portable tools (except double insulated tools) or removing ground connections;

b. Using defective tools or equipment in need of repair;

c. Using equipment which does not meet the approval of the Underwriters Laboratories for the intended use;

d. Unsafe cleaning of electrical panels, switch boxes, motors, and other electrical equipment with water or dangerous solvents;

e. Overloading of circuits or overfusing circuits by the use of wrong size or type of fuse;

f. Failure to use explosion-proof or other special wiring methods in hazardous locations as defined in the National Electrical Code, Article 500;

g. Failure to positively lock out or otherwise de-energize and tag equipment or circuits to be worked on. Do not rely on gloves, rubber mats, etc. for electrical installation and repair.

h. Installation or extension of electrical facilities in a manner not meeting the National Electrical Code;

i. Repetitive closing of switches or circuit breakers when there is a fault on the circuit;

j. Using light duty, ungrounded extension cords for industrial service;

k. Failure to maintain clear access to electrical panels. Clearance of 30 inches is required by the Federal Code.

l. Use of extension cords in place of permanent wiring extensions;

m Work practices which overload motors, insulation, wires or electrical accessories;

n. Disconnecting of electric cords by pulling on the cords rather than on the plug;

o. Use of metal ladders while working on electrical equipment;

p. Failure to label switch panels and boxes.

3. Lack of Knowledge:

Teaching a basic understanding of electrical safety is part of an Industrial Arts Educational Program.

3. Lack of Knowledge: – (Continued)

Ground Fault Protection – a recent development that can save lives: Devices are now readily available which give sure protection against electrocution or serious shock from defective portable tools or cords. Their use should be encouraged in all areas, but particularly where there is a serious shock hazard from wet conditions or other conditions causing massive grounding of the student.

In summary, an adequate program for the prevention and elimination of electrical hazards must rest upon:

a. Intelligent selection and purchase of equipment;

b. Correct installation of equipment;

c. Education of students in the safe use of electrical energy;

d. Periodic inspection of equipment;

e. Regular maintenance.

Fire Safety

1. Provide approved fire extinguishers in the shop area. Multi-purpose dry chemical units are most effective for general use. General purpose fire extinguishers should have at least a 2–A:10–B:C rating. Water backup for extinguishers is always desirable. Multi-purpose dry chemical can damage delicate electrical equipment. Gas type extinguishers eliminate that problem. Halon 1211 is more effective and less costly than CO_2 for extinguishing electrical fires.

2. Store flammable liquids in approved (Underwriters Laboratories or Factory Mutual labeled) safety containers and cabinets.

3. Provide for the inspection and testing of fire extinguishers at regular intervals to ascertain that they are fully charged and in proper working condition. (See National Fire Protection Association Pamphlet 10, "Standard for Portable Fire Extinguishers" for details.)

4. Provide instruction to students in the location and proper use of fire extinguishers and other fire-fighting equipment.

5. Provide for the bulk storage of flammable materials in an area removed from the main school building.

6. Segregate oxidizers and oily materials in storage. Do not use oxidizer (peroxide catalyst) containers for other purposes.

7. Prohibit use of flammable liquids for cleaning purposes.

8. Provide Underwriters Laboratories Listed oily waste containers for oily and paint soaked rags. It is a good policy to place waste with high spontaneous combustion potential in water-filled containers. (See National Fire Protection Association Pamphlet 30, Para. 4450, "Flammable and Combustible Liquids Code".)

9. Post fire alarm and evacuation procedures.

10. Students should know remote shut-off valve or switch locations for gas or oil-fired equipment and how to de-energize electrical equipment in an emergency.

11. Deluge showers would be desirable in all Industrial Arts laboratories, especially where there is danger of fire igniting clothing made of synthetic materials.

First-Aid Planning

1. Review status of first-aid training among instructional and service staff so that coverage by trained and accredited first-aid personnel will be available whenever industrial arts classes are in session.

2. Arrange for refresher training as necessary.

3. Provide a first-aid kit for the shop area in addition to any supplies that may be available when the school nurse is present. Kit should meet standards for a 36-package kit.

   Contents of 36-package first-aid kit as shown in the WISHA* General Safety and Health Standards are:

   4 packages Absorbent Gauze, 24" x 72" (1 per package)
   2 packages Adhesive Bandages, 1" (16 per package)
   5 packages Bandage Compresses, 4" (1 per package)
   2 packages Eye Dressing (1 per package)
   1 package Scissors and Tweezers (1 each per package)
   8 packages Triangular Bandages, 40" (1 per package)
   1 package Antiseptic Soap or Pads (3 per package)
   13 packages of Consulting Physician's Choice

4. Kit should be permanently located where readily visible and available to the trained first-aider. Mark kit location with a green cross on white background. A painted plywood backing board may be more convenient than painting a wall.

5. Post your school policy for:

   a. Administration of first-aid, including emergency eye washing;

   b. Emergency notification procedures;

   c. Transportation of injured;

   d. Accident reporting.

*Recommended by the Washington Industrial Safety and Health Administration, Seattle, Washington.

Personal Protection

1. Confine long hair so that it is not exposed to machinery.
2. Require the wearing of safety goggles or glasses when there is a danger of eye injury.
3. Provide respirators for student use where harmful dusts or fumes exist.
4. Determine the physical defects and limitations of all students so that they will not be assigned tasks detrimental to their health or physical condition.
5. Prohibit the wearing of loose clothing in the laboratory.
6. Require students to remove rings and other jewelry while working in the laboratory.
7. Provide leggings and foot protection when working with molten material.
8. Where noise levels are excessive over long periods of time, ear protection should be worn.

Eye Protection

The Defined Minimum Program of the South Carolina Public Schools requires that eye protection programs be developed and implemented in all areas where there are activities potentially hazardous to the eye.

Protective Eye Devices in Certain Courses

Teachers and students participating in courses as outlined in South Carolina Code Act No. 377 shall be supplied plano protective eye devices.

Act No. 377, An Act To Require The Public Schools Of The State To Supply Plano Protective Eye Devices To Pupils And Teachers Participating in Certain Courses And To Require Pupils And Teachers Desiring Protective-Corrective Eye Devices To Secure Such Devices At Their Own Expense.

Section 1. Certain students and teachers to wear protective eye devices. Every pupil and teacher in any public school participating in any of the following courses:

a. Vocational or industrial art shops or laboratories involving use of or exposure to:

   (1) Hot molten metals;
   (2) Milling, sawing, turning, shaping, cutting, or stamping of any solid materials;
   (3) Heat treatment, tempering, or kiln firing of any metal or other materials;
   (4) Gas or electric arc welding;
   (5) Repair or servicing of any vehicle;
   (6) Caustic or explosive materials.

b. Chemical or combined chemical-physical laboratories involving caustic or explosive chemicals or hot liquids or solids; is required to wear industrial quality eye protective devices at all times while participating in such courses or laboratories. The trustees of each school district shall purchase and cause such plano protective eye devices to be placed in such public schools for the eye protection of pupils, teachers, and visitors to such classrooms or laboratories.

c. Any person desiring protective-corrective lenses instead of plano protective devices supplied by the school trustees shall, at his own expenses, procure and equip himself with industrial quality eye protective devices secured from legally authorized dispensers.

The phrase "industrial quality eye protective devices," as used in this section, means devices meeting the standards of the American Standard Safety Code for Head, Eye, and Respiratory Protection, 22.1-1959, promulgated by the American Standards Association, Incorporated.

School districts have found that they had better eye protection programs when individual glasses had been provided for each student enrolled in the Industrial Arts class.

Good eye protection devices require clean lenses. Lenses shall be cleaned daily with a solution of warm water and soap.

Pitted or scratched lenses shatter easily and should be replaced.

If a protective device is to be worn by more than one student, it will require a means of disinfection. The most effective method of disinfecting eye protective equipment is:

1. Throughly cleansing with soap and warm water;

2. Carefully drying with tissue.

Accidents to the eye can be classified into one of the following groups:

1. Impact
2. Chemical splash
3. Dust
4. Light rays and glare

School officials who are charged with the purchase of eye protection should keep in mind the above exposures and purchase the appropriate eye protection for the exposure.

Potential Hazards From Impact:

Possibly the greatest danger to the eyes is their accidental collision with flying objects. Chips from the chipper hammer or the metal working tool, the waste particles from grinding or woodworking, a broken tool or grinding wheel or an improperly driven nail are all eye exposures that must be protected against.

Plastic frame safety glasses with side shields afford maximum eye protection against impact damage.

Potential Hazards From Chemical Splash:

Protection is needed that absolutely seals the eye against any possible entry.

A plastic flexible frame goggle is excellent protection against less hazardous chemicals and acids. For more severe conditions, flexible vinyl jumbo plate goggles with splash-proof indirect ventilators should be worn.

Potential Hazards From Dust:

Where extreme dust hazards exist, plastic frame flexible goggles are most desirable.

Potential Hazards From Light Ray and Glare:

The light rays cast by welding and cutting operations can be highly injurious to unprotected eyes. Heat treating, metal pouring, steel and glass furnaces and later beams are other sources of glare.

In gas welding, cup type welding goggles with green filter lenses are most commonly used.

For electric welding, helmets are necessary to protect the head and eyes from infrared and ultraviolet radiation burns, hot metal, chips and flying sparks.

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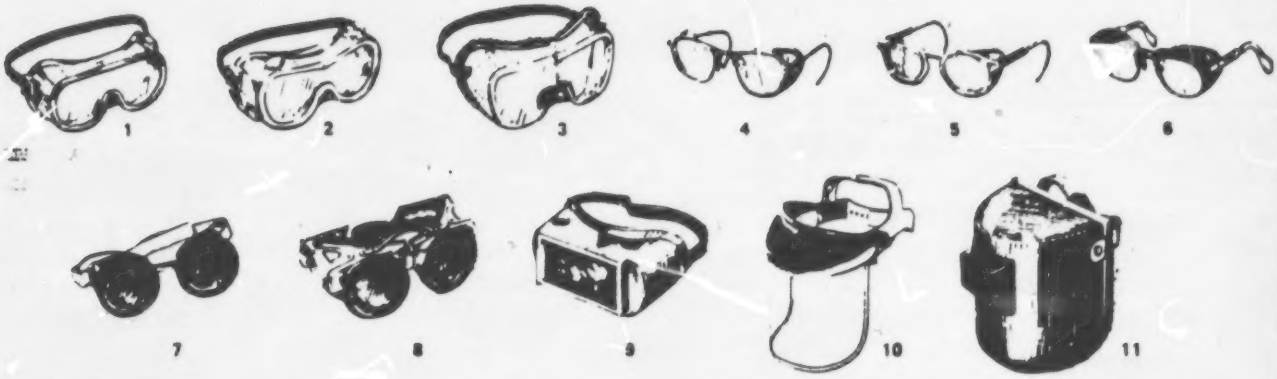

1. **GOGGLES**, Flexible Fitting, Regular Ventilation
2. **GOGGLES**, Flexible Fitting, Hooded Ventilation
3. **GOGGLES**, Cushioned Fitting, Rigid Body
*4. **SPECTACLES**, Metal Frame, with Sideshields
*5. **SPECTACLES**, Plastic Frame, with Sideshields
*6. **SPECTACLES**, Metal-Plastic Frame, with Sideshields
** 7. **WELDING GOGGLES**, Eyecup Type, Tinted Lenses (Illustrated)
7A. **CHIPPING GOGGLES**, Eyecup Type, Clear Safety Lenses (Not Illustrated)
** 8. **WELDING GOGGLES**, Coverspec Type Tinted Lenses (Illustrated)
8A. **CHIPPING GOGGLES**, Coverspec Type, Clear Safety Lenses (Not Illustrated)
** 9. **WELDING GOGGLES**, Coverspec Type, Tinted Plate Lens
10. **FACE SHIELD** (Available with Plastic or Mesh Window)
11. **WELDING HELMETS

*Non-sideshield spectacles are available for limited hazard use requiring only frontal protection.
**See appendix chart "Selection of Shade Numbers for Welding Filters."

APPLICATIONS

OPERATION	HAZARDS	RECOMMENDED PROTECTORS: Bold Type Numbers Signify Preferred Protection
ACETYLENE–BURNING ACETYLENE–CUTTING ACETYLENE–WELDING	SPARKS, HARMFUL RAYS, MOLTEN METAL, FLYING PARTICLES	**7, 8, 9**
CHEMICAL HANDLING	SPLASH, ACID BURNS, FUMES	**2**, 10 (For severe exposure add 10 over 2)
CHIPPING	FLYING PARTICLES	**1, 3, 4, 5, 6, 7A, 8A**
ELECTRIC (ARC) WELDING	SPARKS, INTENSE RAYS, MOLTEN METAL	**9, 11** (11 in combination with 4, 5, 6, in tinted lenses, advisable)
FURNACE OPERATIONS	GLARE, HEAT, MOLTEN METAL	**7, 8, 9** (For severe exposure add 10)
GRINDING–LIGHT	FLYING PARTICLES	**1, 3, 4, 5, 6**, 10
GRINDING–HEAVY	FLYING PARTICLES	**1, 3, 7A, 8A** (For severe exposure add 10)
LABORATORY	CHEMICAL SPLASH, GLASS BREAKAGE	**2** (10 when in combination with 4, 5, 6)
MACHINING	FLYING PARTICLES	**1, 3, 4, 5, 6**, 10
MOLTEN METALS	HEAT, GLARE, SPARKS, SPLASH	**7, 8** (10 in combination with 4, 5, 6, in tinted lenses)
SPOT WELDING	FLYING PARTICLES, SPARKS	**1, 3, 4, 5, 6**, 10

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3.15

Emergency Action

The following procedures and arrangements are suggested approaches for handling emergency first-aid situations. A definite plan should be established before school opens each semester.

Emergency Communications 4.01

First Aid: Administering, Supplies, and Transportation 4.02

EMERGENCY COMMUNICATIONS

1. Procedures should be reviewed with the school staff and principal as to set methods of communications in the event an emergency occurs.

2. Order of notification under following conditions:

   a. If serious injury (uncontrollable situation)

      - ambulance
      - principal
      - parents

   b. If serious injury (controlled situation)

      - principal
      - parents

3. Telephone:

   a. Each industrial arts department should have off-campus communication.

   b. All students should know the locations of the telephones.

   c. Emergency telephone numbers should be conspicuously posted and the procedure posted for dialing "outside".

4. A card file should be maintained in each school for all students. This card should include the names and telephone numbers of parents or guardians to be notified in the case of injury.

FIRST AID

General:

1. Every teacher should have received training in first aid and have a valid first-aid certificate. A valid certificate is one that is less than three years old.

Administering:

1. First aid should be administered by qualified personnel.
2. Do not diagnose illness or prescribe or administer medication of any sort.
3. Disperse crowds if accident is serious and keep the area as quiet as possible.
4. Stick to basic procedures:
   - Call for aid
   - Stop bleeding
   - Treat for shock
   - Mouth-to-mouth resuscitation (if breathing has stopped)
   - Coronary Pulmonary Resuscitation (C.P.R.) (if required)

Supplies:

1. Each laboratory shall have a first aid kit or cabinet properly marked and supplied according to OSHA requirements.

Transportation:

1. Parents shall be notified immediately of all cases of illness or injury. If the student is to be sent home or elsewhere, his parents should arrange for his transportation. The principal should take appropriate action for the best interest of the student.
2. When the injury is serious, do not attempt to move the student except for first aid procedures until professional medical help arrives.
3. If a school is uniquely located where special transportation may be required, a procedure should be established at the beginning of the school year.

Suggested Forms and Outlines

Emergency Telephone Numbers 5.01

Parent Permission and Acknowledgement 5.02

Permission Slip 5.03

Master Checklist 5.04

Hazardous Conditions Report 5.09

First Aid Emergency Procedures 5.10

EMERGENCY TELEPHONE NUMBERS

	Name	Telephone
Ambulance		
Fire Department		
Hospital (nearest)		
Doctor (nearest)		
Main Office		
School Nurse		
Medic 1		
Poison Control Center		

Emergency procedures should be adapted to local conditions and regulations.

An outside telephone should be available for all industrial arts classrooms.

PARENT PERMISSION AND ACKNOWLEDGEMENT

Parent acknowledgement of the student's activities and an awareness of the teacher's interest in the safety of the child is important. The teacher should express this interest at every opportunity.

At the beginning of each industrial arts course a "permission slip" should be sent home with the student for the parent's signature.

Although the "permission slip" does not relieve the teacher, principal nor the shcool district of responsibility, it does fulfill a valuable public relations purpose and it brings home to the parents that their child is engaged in an industrial arts program involving the use of hand and power tools.

On the following page is a sample "permission slip" that can be duplicated for your use.

PERMISSION SLIP

South Carolina Public Schools
Department of Industrial Arts
School: _____
Teacher: _____

Name of Parent or Guardian: _____

_____ is enrolled in our industrial arts program and will have the opportunity to
(name of student)
use various tools and equipment. Appropriate instruction in the proper use of the tools and equipment is given and close supervision is maintained. Every precaution is taken to prevent accidents. We are asking your cooperation in impressing _____ with the importance of being
(name of student)
careful. It is mandatory that all students accept the obligation to obey the safety rules designed to protect them and others.

You are welcome to visit our industrial arts facilities. Please check through the main office.

I give my permission for _____ to use the tools and equipment in the industrial arts
(name of student)
program.

_____
(parent or guardian)

I agree to accept the obligation to obey the safety rules of the laboratory at all times.

_____
(date) (student)

Please identify any health problems which may have a bearing on your student's participation in this class: _____

_____

SOUTH CAROLINA INDUSTRIAL ARTS SAFETY INSPECTION CHECK LIST

School _____ Laboratory _____ Date _____

Instructor _____ Inspected By _____

PURPOSE

A safe environment is an essential part of the industrial arts safety education program. The safe environment will exist only if hazards are discovered and corrected through regular and frequent inspections by school personnel—administrators, safety coordinators, teachers and students. Safety inspections are to determine if everything is satisfactory.

A safety inspection checklist for industrial education is an objective tool for helping improve working conditions in the area where used. Using a safety checklist for the inspection has some advantages over other methods of safety inspection. This list is intended to accomplish the following:

1. Inform, educate and remind people of what to look at.
2. Train personnel to be observant and aware of their environment.
3. Provide a source of feedback information to teachers and administrators. This allows them to determine the effectiveness of their safety program and training.
4. Provide a record of safety items and safety activity.

INSTRUCTIONS FOR USE

1. A safety inspection team should complete the checklist for each industrial arts laboratory. (The building principal should be a member of the team.)
2. As a minimum, safety inspections should be made at the beginning of every school term or semester. More frequent inspections may be advisable.
3. Inspections should be planned in advance, preferably for times when students will be using the facility.
4. The current inspection report should be compared with previous reports and records to determine progress. The report should be studied in terms of accident situations so that special attention can be given to these conditions and locations which are accident producers.
5. In all cases where unsatisfactory responses are indicated it is important that corrective actions be noted and copies forwarded to the proper authorities.
6. Each unsafe condition should be corrected as soon as possible in accordance with accepted local procedures.

CHECKING PROCEDURE

Draw a circle around the appropriate letters, using the following code. Respond to all items:

S —Satisfactory (needs no attention)

U —Unsatisfactory (needs immediate attention)

NA— Not applicable

Recommendations should be made in all cases where a "U" is circled. Space is provided at the end of the form for such comments. Designate the items covered by the recommendations, using the code number applicable (e.g. B-2)

A. SCHOOL ADMINISTRATION

1. The school principal and school safety officer visit all laboratories to check for hazardous conditions and to make provisions for corrections . . . . . S U NA
2. The school principal arranges for outside assistance for the regular twice-a-year safety inspections . . . . . S U NA
3. The school principal requires that standardized written reports on hazardous conditions be submitted and distributed to the proper individuals to assure corrective action S U NA
4. A written procedure has been established for reporting defective equipment immediately to assure prompt repair S U NA
5. The school principal keeps records of all inspections and these records are readily available for reference . . . . S U NA
6. The school district has defined "an accident" and has available employee and student accident reporting forms which fulfill the state statistical requirements . . . . . S U NA
7. All accidents are promptly reported and analyzed. Immediate steps are undertaken to correct causes of accidents, and copies of all reports are kept in a school file until it is determined they are no longer necessary. . . . . S U NA
8. The school has readily available all necessary information in order to reach parents or guardians in case of emergency S U NA

A. SCHOOL ADMINISTRATION (continued)

9. The school has an effective policy and procedure to follow in case of accidents . . . . . S U NA

10. The school has a policy and procedure for the administration of first aid . . . . . S U NA

11. The school has approved first aid kits available in the industrial arts laboratory and the contents are maintained in a serviceable condition . . . . . S U NA

12. The school principal accepts the responsibility for keeping class sizes appropriate for activities, student age, facility size, and the number of work stations available . . . . S U NA

13. The school principal is aware of his responsibility and liability in regard to students protection . . . . . S U NA

14. The school principal requires that the shop areas be maintained and cleaned, and provided with the same custodial services available to other general education programs . . S U NA

15. The school principal will make sure that a qualified instructor is in attendance when student machine work takes place . . . . . S U NA

B. INSTRUCTOR

1. Industrial arts teacher supervision is provided at all times when classes are in session . . . . . S U NA

2. The instructor inspects his facility at least once a month to discover needed repairs and corrections . . . . . S U NA

3. The instructor utilizes an inspection checklist when making inspections . . . . . S U NA

4. The instructor reports all hazardous conditions to the proper administrator . . . . . S U NA

5. The instructor keeps records of all inspections and has copies of inspection reports readily available for reference S U NA

6. The instructor keeps records of all maintenance problems and the disposition of requests for corrections . . . . . S U NA

7. The instructor keeps records of all accidents, and analyzes them immediately for corrective measures . . . . . S U NA

8. The instructor is knowledgeable in first aid, and deemed qualified by the principal to act in case of emergency . . S U NA

9. The instructor selects students activities keeping in mind the maturation level and ability of the students involved . S U NA

10. Instructor-owned tools are not used by the students unless a district policy has been established to cover their use, and the school principal has been informed . . . . . S U NA

11. The instructor makes sure that students wear protective equipment when needed . . . . . S U NA

12. Instruction is reinforced by continuous proper example through deeds and actions of the instructor, such as wearing protective equipment in all situations deemed necessary S U NA

13. The instructor makes sure that no student machine work is done unless a qualified instructor is in attendance . . . S U NA

14. The instructor is knowledgeable in the use of the various fire extinguishers in his facility . . . . . S U NA

15. When classes are not in session, the instructor makes sure that all main power switches are in the "off" position . . S U NA

16. The instructor makes sure that all machines are off and locked out when they are being cleaned or adjusted . . . S U NA

17. A system for handling hot materials has been established S U NA

B. INSTRUCTOR (continued)

18. Routine preventative maintenance is practiced to assure against breakdown of equipment and safety protection devices . . . . . S U NA

19. The instructor is responsible to see that students with known infectious diseases do not interchange personal protective equipment until it has been sterilized . . . . . S U NA

C. INSTRUCTION

1. The student's sense of responsiblity is promoted, developed and periodically evaluated . . . . . S U NA

2. Students receive instruction and knowledge in the use of all tools and equipment they are expected to operate . . S U NA

3. Students are checked out and permission is granted before machines are operated . . . . . S U NA

4. Ground rules are established and enforced for safe, efficient shop operation . . . . . S U NA

5. Students are instructed and alerted to all possible hazardous operations and are scrutinized in these activities . . . S U NA

6. "Horseplay" and practical jokes are dangerous and are not tolerated . . . . . S U NA

7. Proper instruction and warning are given in the use and handling of toxics, caustics and volatile materials . . . . . S U NA

8. In order to provide continuous safety instruction, questions on safety are included in all phases of the instructional program . . . . . S U NA

9. Students are instructed in the proper methods of handling and lifting materials . . . . . S U NA

10. Students are responsible to see that they and other students are clear of machines when turning them on, never to leave a machine in a running position, or stop one with their hands or a piece of material . . . . . S U NA

11. Students are instructed to stay clear of others operating machines and, if necessary to approach an operator, to do so in such a manner as not to annoy or alarm him/her . . S U NA

12. All work undertaken is approved through some established method before proceeding . . . . . S U NA

13. Materials being worked are secured when the operation being conducted so demands . . . . . S U NA

14. A class personnel organization is used making pupils aware of safety. (Student safety engineer.) . . . . . S U NA

15. Safety bulletin boards, posters and student reports are part of the total safety program . . . . . S U NA

D. PERSONNEL PROTECTION

1. In all areas where even a remote possibility of eye injury exists, proper safety glasses, shields or googles are provided and worn. (Equipment must meet U.S.A. standards Z87.1-1968.) . . . . . S U NA

2. Eye-wash baths and showers are available when using caustic materials . . . . . S U NA

3. After use, eye-protective devices are cleaned and returned to properly designed storage racks . . . . . S U NA

4. In all areas needing special body-protective clothing, such clothing is provided and used. (Examples: aprons, shoes, gloves.) . . . . . S U NA

D. PERSONNEL PROTECTION (continued)

5. Students are cautioned on the danger of loose clothing, jewelry, ties, long hair, etc. (Regulations in regard to their dangers are enforced.) . . . . . S U NA

6. All injuries are reported to the instructor for immediate attention . . . . . S U NA

E. GENERAL FACILITY

1. One instructor has the overall responsibility for each major shop facility . . . . . S U NA

2. Each major shop facility can be locked separately . . . S U NA

3. Provision has been made for keeping inappropriate garments and other materials out of activity areas . . . . S U NA

4. Good housekeeping standards are observed . . . . . S U NA

5. The student educational cleanup program is backed up daily with complete custodial services . . . . . S U NA

6. Waste (shavings, sawdust, paint, and oil rags) is collected daily and disposed of by the custodian . . . . . S U NA

7. Floors are maintained in a condition conducive to safe practices with nonskid surfaces provided around machines S U NA

8. Designated safety zone areas are provided around all dangerous areas of work . . . . . S U NA

9. Aisles are clear of protruding materials . . . . . S U NA

10. Room furniture and equipment are arranged for optimum safety . . . . . S U NA

11. Stairways within existing laboratories have safe tread and rise with unobstructed access and with approved railings . S U NA

12. Railings and treads are color coded . . . . . S U NA

13. Two widely separate marked exists are available from each major laboratory area . . . . . S U NA

14. Facilities are light, pleasant, clean and conducive to good instruction . . . . . S U NA

15. Machine operation regulations and safety procedures are posted conspicuously near areas of operation . . . . . S U NA

16. Parts of machines and equipment needing special attention or caution are painted brightly with correct color code S U NA

17. Machine and work stations are located in relationship to the amount of supervision required . . . . . S U NA

18. Machine location has been determined by needed operator space requirements and process compatibility . . . S U NA

19. Health hazards were considered in plant design to minimize injuries from excess heat, noise, fire and fume conditions . . . . . S U NA

F. STORAGE

1. Storage racks and shelves are designed and constructed to meet storage requirements . . . . . S U NA

2. Materials are securely stored . . . . . S U NA

3. Students and instructors are protected from protruding materials and sharp edges. (Have material cut in half at time of purchase.) . . . . . S U NA

4. All flammable and combustible liquids, toxics and caustics are stored securely in proper containers, identified by name and degree of hazard . . . . . S U NA

F. STORAGE (continued)

5. Fire-approved storage cabinets are provided for all flammable and combustible liquids . . . . . S U NA

6. Provision has been made for a fire-approved bulk storage area. (Refer to local fire marshal) . . . . . S U NA

G. ELECTRICAL

1. All power wiring is installed and maintained in accordance with national electric code—and—
   (a) Switches are enclosed . . . . . S U NA
   (b) Circuits are identified . . . . . S U NA
   (c) All power cords are of proper length- . . . . . S U NA
   (d) Power supplies are provided with overload protection . . . . . S U NA
   (e) Lockouts are provided . . . . . S U NA

2. All outlets and machines are grounded . . . . . S U NA

3. All extension cords are three-wire with proper connections S U NA

4. All portable power tools are provided with three-prong plugs, except those which are double insulated . . . . S U NA

5. Readily accessible individual "off" and "on" controls are installed on all machines as well as in the room power-control panel . . . . . S U NA

6. On machines where injury might result if motors were to restart after major power shutoff, provision is made to prevent such restarting. (Magnetic switches.) . . . . . S U NA

7. A master-control switch is available and conveniently located in each laboratory to shut off power . . . . . S U NA

8. Each laboratory area has its own master-control switch and power panel located for easy access . . . . . S U NA

9. Laboratory power panels have clearly identified individual power switches for each machine . . . . . S U NA

10. Extension cords are not used for permanent installation S U NA

11. All hand-held portable power tools are equipped with "dead man" controls only . . . . . S U NA

12. Regulator, stands and pilot lights are provided for all electrical soldering irons . . . . . S U NA

H. EQUIPMENT

1. Instructions for safe use of machines are posted near each machine . . . . . S U NA

2. Machines are in safe operating condition at all times . . S U NA

3. "Out-of-order" signs are secured to machines not in working order and power panel switch is in "off" position S U NA

4. All machines are securely fastened in place according to good industrial practice . . . . . S U NA

5. Machines and equipment are provided with guards meeting industrial standards and guards are in proper position for safe machine operation . . . . . S U NA

Items requiring special consideration:

(a) Squaring shears finger guard . . . . . S U NA

(b) Foot treadle stops on squaring shears . . . . . S U NA

(c) Jointer knife guards—left and right . . . . . S U NA

H. EQUIPMENT (continued)

(d) Abrasive wheel safety eye shields . . . . . S U NA

(e) Abrasive wheel tool rests . . . . . S U NA

(f) Abrasive wheel guards . . . . . S U NA

(g) Table saw guard including antikickback . . . . . S U NA

(h) Radial saw guard . . . . . S U NA

(i) Radial saw forward stop and positive saw return . . S U NA

(j) Radial saw antikickback device . . . . . S U NA

(k) Machine belt and pulley guards . . . . . S U NA

(l) Air compressor belt guards . . . . . S U NA

(m) Compressed air is not used for cleaning purposes until it has been reduced to less than 30 p.s.i. . . . . S U NA

(n) Compressed air is not used for cleaning purposes where possibility of eye injury exists . . . . . S U NA

6. Equipment control switches are readily accessible to the operator while he/she is in a normal operating position . S U NA

7. A positive "off" position switch is located on each machine . . . . . S U NA

8. Proper tools and materials are available for machine cleaning . . . . . S U NA

9. Hand-tool equipment is stored with sharp cutting edges protected . . . . . S U NA

10. Hand tools are properly maintained and kept sharp . . S U NA

11. Bench tops are in keeping with the activities planned. (Example: electrical bench tops are made of nonconductive materials.) . . . . . S U NA

12. Properly designed and constructed auto stands and roll blocks are used. (A sufficient supply is available to meet the needs of the power mechanics areas.) . . . . . S U NA

13. Engine stands are properly designed and constructed . . S U NA

14. All hoists and A-frames are properly constructed, designed for the job undertaken, labeled as to capacity and fitted with a safety lock . . . . . S U NA

I. FIRE

1. When available, only U.L. approved equipment will be used. S U NA

2. A sufficient number of proper fire extinguishers (periodically inspected, dated and recharged) is readily accessible in all activity areas . . . . . U NA

3. Water fire extinguishers or 2½ gal. buckets of water are available for clothing fires (fire blankets are no longer acceptable because of polyester clothing) . . . . . S U NA

4. Area behind fire extinguisher is color coded . . . . . S U NA

5. Extinguishers are hung at approved heights . . . . . S U NA

6. Adequate exit doors and open aisles are available for prompt evacuation . . . . . S U NA

7. Fire-approved (U.L. FM) storage and waste containers are readily accessible, used and emptied daily . . . . . S U NA

8. Sander bags are emptied daily before shop is closed . . S U NA

9. Parts (solvent) wash tanks are fire fused . . . . . S U NA

I. FIRE (continued)

10. Finish and spray room doors swing out and cannot be locked from the inside . . . . . S U NA

11. Filters in spray booths are replaced regularly . . . . . S U NA

12. Clean, warm makeup air of sufficient volume is provided to replace air exhausted during sprayed . . . . . S U NA

J. WELDING

1. Proper protective clothing is worn when needed . . . . S U NA

2. Goggles with the proper lenses are used when torch welding (U.S.A. standards Z87.1.1968) . . . . . S U NA

3. A standard arc-welding helmet with proper lenses is used when torch welding. (U.S.A. standards Z87.1.1968) . . S U NA

4. Observers use acceptable protection (See J-1; J-2; and J-3;.) S U NA

5. Welding is done only in areas free of combustible materials S U NA

6. Cylinders are secured upright, clear of passageways, and stored in ventilated areas . . . . . S U NA

7. Extra cylinders are properly stored, meeting regulations of the Department of Labor and Industries . . . . . S U NA

8. Gas pipelines have been installed and are maintained according to code . . . . . S U NA

9. Pipelines are checked each year by persons knowledgeable with code requirements . . . . . S U NA

10. Piped welding systems will have back-pressure valves in both lines and conveniently located shutoff valves which will not be quick opening . . . . . S U NA

11. Torches and regulators are clean, well maintained, and in good operating condition . . . . . S U NA

12. Hoses are maintained in good condition . . . . . S U NA

13. Only spark lighters are used to light torches . . . . . S U NA

14. Anti(fire) flashbacks are installed where required in all hoses and lines . . . . . S U NA

15. The welding area is located in such a manner that an arc cannot be struck on (gas) cyliners, gas lines or water lines. S U NA

16. Reflective screens are provided and used to protect others from arc flashes and burns . . . . . S U NA

17. When items to be welded will not fit into screened area, all persons near area will be provided proper protective equipment. (See J-4) . . . . . S U NA

18. Arc welding is done in dry areas only . . . . . S U NA

19. The electrode holder is maintained and stored in good condition to eliminate possible accidents arc . . . . . S U NA

20. Proper ventilation is provided . . . . . S U NA

K. GAS

1. Gas-operated equipment is ignited from an automatic ignition system . . . . . S U NA

2. Automatic temperature and safety controls are installed to control temperatures . . . . . S U NA

3. The main supply cutoff valve is identified, is readily accessible, and is located outside possible heat or fire areas S U NA

K. GAS (continued)

4. An outside air source is provided in the foundry and forge areas to conterbalance the air used in the operation of this equipment . . . . . S U NA

5. Gas equipment is provided with a shutoff valve and safety system. (Example: spark ignition gas pressure-regulator, safety gas-check valve, etc.) . . . . . S U NA

6. Nonflammable insuleting materials have been installed adjacent to gas appliances . . . . . S U NA

7. Warning signs are posted when hot metals are poured . . S U NA

8. Properly designed and constructed equipment is used for handling molten metal when casting . . . . . S U NA

Use enclosed sheet for recommendations.

RECOMMENDATIONS

School _____ Laboratory _____ Date _____

Instructor _____ Inspected By _____

Code No.	

HAZARDOUS CONDITIONS REPORT

This is a suggested method for reporting the hazard and directing action to see that the hazard is corrected or removed.

If a hazard exists, the operation should be "red tagged" and shut down until corrected.

HAZARDOUS CONDITIONS REPORT

Date _____

To: _____ _____ _____
(Building Administrator) (Position) (School)

Description and Location of Health or Safety Hazard: _____

_____

_____

Suggested Solution: _____

_____

_____

Teacher Signature: _____

Distribution: Original – Building Administrator
1st Copy – Department Head
2nd Copy – Teacher Reporting Hazard

Action Taken: _____

_____

_____

_____

By Whom: _____
(Signature)

FIRST AID

Depending upon the injury, take the following steps immediately:

Send for aid immediately:

Have someone notify the department head and/or principal. Never leave the injured alone.

Stop the bleeding:

Use compress – do not use tourniquet unless trained.

Treat for shock:

Keep the victim warm.
Do not move victim if major bone fracture is likely.

Breathing:

If breathing has stopped, start mouth-to-mouth resuscitation.

Coronary Pulmonary Resuscitation:

If required.

Note: These emergency procedures should be posted in a conspicuous place within the work area.

Facility Design and Layout

The manner in which industrial arts facilities are designed and laid out has a direct bearing on accident prevention. The planning elements which should be considered are:

1. Space allocations
2. Lighting
3. Ventilation
4. Personal services facilities
5. Selection of machine tools and hand tools
6. Special hazards
7. Noise control

Facility Design and Layout – Space – Lighting 6.01–6.02

Ventilation, Personal Facilities 6.02–6.03

Selection of Machine Tools 6.03

Noise Control 6.03–6.04

Space Allocation, Placement of Equipment and Traffic Flow

As a general rule, all machines, benches and laboratory equipment should be surrounded by a minimum of three feet of clear space. Certain machines such as cut-off saws, shears, jointers, planers, drill presses and lathes may need more space to accommodate the long materials that are ordinarily processed with these machines.

Major aisles should have a minimum width of four feet, while secondary walkways should be at least three feet.

Sufficient open floor space to prevent crowding and interference among students must be provided around all doorways, in project assembly areas, demonstration area, around tool cribs and tool panels and near material storage areas.

Machines that are more than four feet in height should be placed toward the outside of the room so that visibility will not be obstructed.

The following space recommendation table is from the 1974 "Guide to Preparing Educational Specifications for Secondary Industrial Arts Facilities", published by the American Council of Industrial Arts Supervisors.

An Example of Space Recommendations for Traditional Industrial Arts Courses:

	Square Feet Per Student		
	Minimum	Adequate	Desired
General Shop	80	100	125
Crafts	75	100	125
Metals	75	100	125
Drafting	40	50	60
Ceramics	60	70	80
Electricity	60	70	80
Woods	80	100	125
Power Mechanics	75	80	100
Plastics	60	70	80
Graphic Arts	75	80	100

More detailed space allocations for machines are listed in this publication and in the "Guide to Equipping Industrial Arts Facilities" by the American Industrial Arts Association.

Flammable liquids storage areas need to be located on exterior walls away from exits so that explosion relief, ventilation, fire fighting and evacuation will be aided. See National Fire Protection Association Pamphlet 30, "Flammable and Combustible Liquids Code"

Bulk storage of compressed gas needs ventilation and at least 20 feet of space or a fire barrier between oxygen and fuel gas cylinders.

Lighting:

In addition to basic Illuminating Engineering Society lighting recommendations of 70 foot candles for laboratory areas and 100 foot candles for drafting areas, the following additional lighting should be considered when planning illumination requirements.

1. Adjustable lamps for illuminating the point of operations on hazardous machines.

2. Portable lamps to provide temporary illumination for projects requiring supplemental lighting.

3. Flexible lamps for fine precision bench work and inspection work.

Ventilation:

There is a definite relationship between proper ventilation, comfort level and the frequency of accidents.

General ventilation is accomplished by introducing fresh air into school shops at the rate of at least six air changes per hour or of sufficient quantity to balance air flow through stock removal and other exhaust systems. General ventilation is commonly accomplished by both blowers and exhaust systems. Air movement should not be more than 25 lineal feet per minute during the heating season and 100 lineal feet per minute during warm weather.

Have the ventilation system checked at the beginning of each school year by experienced personnel to determine effectiveness.

Special consideration should be given to ventilation requirements for welding, foundry, forging, heat treating, machining cast iron, machine woodworking, auto mechanics, plastics forming and grinding, electroplating, etching, painting and the making of blueprints. For many of the above operations specially designed hoods must be required.

Personal Service Facilities:

A sanitary drinking fountain should be available at a convenient location

At least one wash basin with hot and cold water should be provided for every twenty students. An adequate supply of soap and paper towels is necessary and receptacles should be provided for waste towels.

In areas where hazardous chemicals may be used, deluge showers and eye wash fountains should be in the immediate vicinity of the hazard.

Lockers for students' clothing and belongings should be well ventilated and firmly anchored.

Selection of Machine Tools and Equipment:

All purchase orders should state "must comply with all State and Federal safety orders in force as of date of purchase".

Special Hazards:

With the introduction of many new processes and products in industry the school planners and administrators must be ever alert to the safety requirements that must be provided by building design, special guarding, personal protective equipment or training.

Noise Control:

Student and teacher exposure to noise must be kept below permissible O.S.H.A. sound levels.

The teacher can evaluate the classroom noise exposure by using the simple approach, that if normal voices two feet away from the listener cannot be understood there is probably excessive noise. This can be much more accurately accomplished by noise surveys performed with meters by people experienced in this field.

There are three basic approaches to noise control and the method of control must be approached in the following order.

1. Engineering Controls – these controls include:

   (a) Substitution of quieter equipment or procedures.

   (b) Confining or absorbing sound barriers, including enclosures, baffles or mufflers. Special energy absorbing pads or foundations for certain machinery or equipment may be helpful.

   (c) Establishing noise level specifications for the purchase of new machinery.

(d) Establishing preventive maintenance programs, such as frequent and proper sharpening of cutter heads, that will keep existing machinery as quiet as possible.

2. Administrative Controls -- This type of control refers to limiting the amount of time that a student or the teacher would be exposed to various noise levels.

Below are the present O.S.H.A. permissable noise exposures:

Duration Per Day (hours)	Sound Level dba
8	90
6	92
4	95
3	97
2	100
1½	102
1	105
½	110
¼ or less	115

3. Personal Protection – These controls will involve the use of ear muffs or ear plugs. This is looked upon with the least favor by codes but may be the only effective short term answer for instructors where exposure times are much greater than for students. Ear plugs and muffs must be fitted properly to be effective.

SUGGESTIONS AND CORRECTIONS SHEET

This guide is designed so that new ideas and changes may be easily incorporated. Any and all suggestions and/or corrections will be most welcome while this guide is in use. Please mail your ideas to:

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